California Energy Commission
Public Interest Energy Research (PIER) Program
TRANSPORTATION ENERGY RESEARCH

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Algae OMEGA

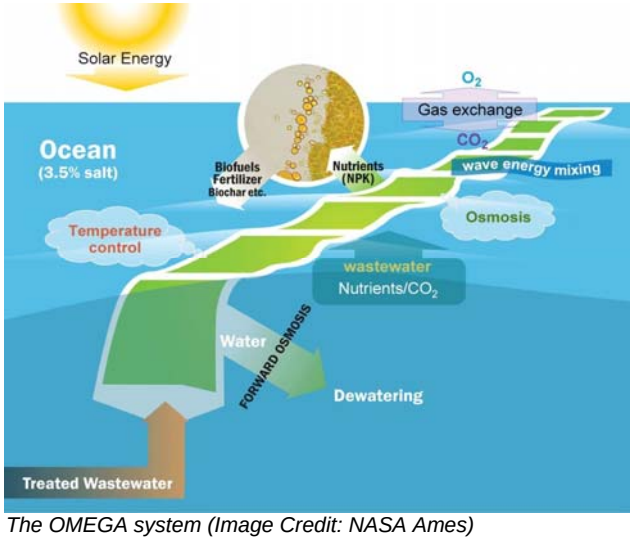
(Offshore Membrane Enclosures For Growing Algae)

March 2010

Fact Sheet

The Issue

Compared to conventional fuel production, algaculture remains up to one hundred times too expensive to make into commercially viable biofuels that are necessary to reduce greenhouse gas (GHG) emissions that result in global climate change. It is well known that microalgae can provide a significant amount of carbon-neutral, sustainable biofuels when they are grown in large quantities under economical conditions but, to date, there are no algae cultivation methods on land that meet these requirements of scale and economics for biofuels.



The OMEGA system (Image Credit: NASA Ames)

Project Description

This research will demonstrate the feasibility of NASA Ames's Offshore Membrane Enclosures for Growing Algae (OMEGA) system. The OMEGA enclosures are, in very simple terms, large and durable plastic bags incorporating forward osmosis membranes to dewater and concentrate the algae within. The following four milestones will be met:

1. Module Integrity Testing to ensure a robust mechanical design, *i.e.* the bags and associated equipment will not degrade or fail prematurely.
2. Dewatering Functionality Test to prove the capacity of the forward osmosis membranes to concentrate the algae *in situ*.
3. *In Situ* Growth Test to demonstrate the viability of growing sufficient fuel quantities of algae in the OMEGA modules.
4. Large-scale Harvest and Lipid Extraction to demonstrate the feasibility of this technology in commercial application.

PIER Program Objectives and Anticipated Benefits for California

The objective of this research is to improve and advance direct biosynthetic technologies that demonstrate the potential to supply transportation fuels for California in order to:

- Advance the commercial availability of renewable transportation fuels as a sustainable carbon-neutral supply of liquid fuels.
- Expand the state's portfolio of fossil-free transportation fuel options.
- Develop new fuel sources with lower net GHG emissions, and with potential to help stabilize atmospheric carbon dioxide concentrations.
- Develop a potentially carbon-neutral supply of sustainable transportation fuels fungible with conventional petroleum fuels and fully compatible with the existing infrastructure system.
- Enhance the supply and affordability of future transportation fuel choices for California consumers.
- Create new in-state fuel production options along with their associated economic development and employment opportunities.

Project Specifics

Contract Number: PIR-08-047
Contractor: NASA Ames Research Center
Contract Amount: $793,576
Contract Term: September 2009 to March 2011
Match Funding: $6,424 NASA

For more information, please contact:

David Effross
California Energy Commission
PIER Program, Transportation Research Office
Phone: 916-654-4739
E-mail: deffross@energy.state.ca.us

Jonathan Trent
NASA Ames Research Center
Phone: 650-604-3686
E-mail: Jonathan.D.Trent@nasa.gov

California Energy Commission
Public Interest Energy Research
1516 Ninth Street
Sacramento, CA 95814-5512

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